

New Views of the Moon II:
Understanding the Moon Through the Integration of Diverse Datasets

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The Lunar Crustal Thickness from Analysis of the Lunar Prospector Gravity and Clementine Topography Datasets

Abstract

The Lunar Prospector spacecraft has mapped the gravity field of the moon to a level of resolution never achieved before and a spherical harmonic representation to degree and order 100 is available. When combined with the topography dataset produced by the Clementine mission, the resulting Bouguer anomaly map is interpreted to model the thickness of the lunar crust. Such models are crucial to understanding the lunar thermal history and the formation of geological features such as mascon basins, several more of which have been newly discovered from this dataset. A two-layer planetary model was used to compute the variations of the depth to the lunar Moho. The thickness values ranged from near zero to 120 km. There is significant agreement with previous work using the Clementine gravitational field data [1] with differences in specific locations such as South Pole-Aitken basin, for example.